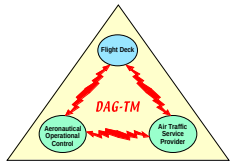
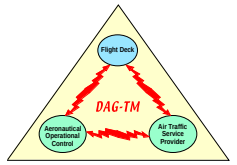


NASA's Free Flight Air Traffic Management Research

Robert Jacobsen
Associate Director, ASC Program

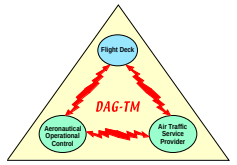
NASA Free Flight/DAG-ATM Workshop
May 22-24, 2000



Free Flight Definition

Free Flight is "a safe and efficient flight operating capability under instrument flight rules (IFR) in which the operators have the freedom to select their path and speed in real time. Air traffic restrictions are only imposed to ensure separation, to preclude exceeding airport capacity, to prevent unauthorized flight through Special Use Airspace (SUA), and to ensure safety of flight. Restrictions are limited in extent and duration to correct the identified problem. Any activity which removes restrictions represents a move toward free flight."

RTCA Select Committee on Free Flight, 1995

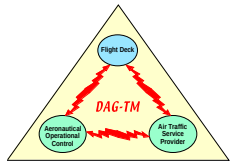


NASA's Effort to Support Free Flight

As part of the AATT project, NASA is conducting research efforts to support the RTCA Free Flight initiative

This effort is founded on

- RTCA Free Flight OPSCON (Task Force 3) document
- FAA's OPSCON 2005
- FAA's Architecture 4.0

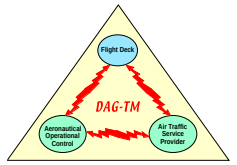


RTCA's Free Flight Task Force 3

"For 2005, the concept describes the next incremental steps towards Free Flight…The Mature State captures more advanced concepts and capabilities, such as self-separation"

"Separation assurance remains the responsibility of the service provider. However, that responsibility is shifted to the flight deck for specific operations"

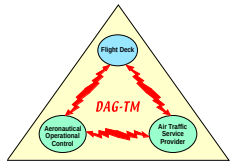
[from Section 1.4 *The Evolution of NAS*]



FAA's OPSCON for 2005

"As a result of the new systems in place in 2005…air safety has been increased through implementation of conflict detection and resolution tools, the inclusion of the flight deck in some separation decision-making, and greatly enhanced weather detection and reporting capabilities" (Narrative, Pg. 2)

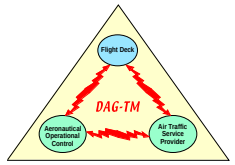
"Separation assurance remains the responsibility of the service provider. However, that responsibility is shifted to the flight deck for specific operations" (Narrative, Pg. 2)



FAA's Architecture 4.0

"Modernizing the NAS will involve technology and cost risks. Some of the technologies…have not been tested in a operational environment…aircraft air-air separation…[will] require testing and validation prior to implementation" [§2.6]

"The essential focus is the Free Flight vision of a future NAS that permits users to fly without the constraints…this shift will be made possible by decision support tools for controllers, an enhanced pilot role in separation assurance using advanced cockpit avionics, use of space-based navigation aids, and use of a dynamic collaborative decision-making process" [§4.9]



DAG-TM Definition

Distributed Air-Ground Traffic Management (DAG-TM) is a National Airspace System concept in which Flight Crews, Air Traffic Service Providers, and Aeronautical Operational Control personnel use distributed decision making to:

- Enable user preferences/flexibility, and
- Increase system capacity, and
- Meet air traffic management requirements

The DAG-TM concept is an example of "mature"state Free Flight providing the direction for supporting research and development activities.

Scope of Free Flight Operational Concepts